

Fibromyalgia is a syndrome characterized by chronic diffuse pain and sleep disturbances that are often accompanied by a variety of non-specific complaints. Patients typically exhibit exquisite tenderness to palpation of specific points on the body. There are no significant laboratory or pathologic findings that aid in the diagnosis (1). The management team includes physicians, nurses, mental health professionals, and rehabilitation providers.

The syndrome's cause is uncertain, but patients may report a prior traumatic experience—either physical or emotional (2). The pathophysiology of fibromyalgia is poorly understood. The sleep disturbance reflects an inability to achieve restful sleep. Arousals (awakening) occur before the patient can achieve rapid eye movement (dream) sleep. Other potential etiologies for the development or persistence of fibromyalgia may involve genetic predisposition to disordered epinephrine/norepinephrine, dopamine, serotonin, 5-hydroxytryptophan, cytokines, substance P, and *N*-methyl-D-aspartate receptor mechanisms (1).

Limited understanding of the causes and mechanisms underlying fibromyalgia has resulted in management based upon anecdote, experience, and trial and error. At this time, there are no pharmaceuticals approved for fibromyalgia, but a few agents are currently under consideration by the Food and Drug Administration. The lack of understanding of the condition and its treatment is reflected in the poor response to treatment often observed, despite the best efforts of the management team (3).

The difficulty in treating fibromyalgia may create a culture of avoidance or even disdain toward these patients from their caregivers. Practitioners must recognize and address their own issues as they relate to caring for such patients (4). Patients with fibromyalgia should be given the opportunity to improve their condition. However, both patients and their providers must establish realistic goals and expectations—acknowledging the likelihood that cure or even significant improvement is low in many cases.

PREVALENCE

Fibromyalgia has been diagnosed in both sexes, with women between the ages of 30 and 50 being disproportionately affected (5). Prevalence estimates range from 2% to 8% (6). Patients may have experienced a traumatic episode that they often relate to the development of fibromyalgia (2). Before being diagnosed, these patients have frequently visited multiple practitioners over years and have had many tests, the results of which have been normal or unhelpful. Patients are often frustrated as a result of their experience with practitioners.

Major depression occurs in 30% of fibromyalgia patients (7). The relationship between pain and depression in fibromyalgia is unclear. Pain processing in the central nervous system (CNS) may not differ between fibromyalgia patients and controls, however, reaction to the same painful stimulus may vary considerably. Depressed fibromyalgia patients react to pain differently than control fibromyalgia patients (8). Fibromyalgia patients who catastrophize about their pain appear to have unique functional magnetic resonance images (9).

The exaggerated response to pain upon tender point palpation may be partially explained by such phenomena.

DIAGNOSIS

Fibromyalgia syndrome comprises a variety of signs and symptoms. There are no diagnostic criteria, however agreement among researchers have resulted in classification criteria that are useful as a diagnostic guideline (see Table 1) (10). These include pain in all 4 quadrants of the body and tender points at specific sites on the body that are elicited during physical examination.

Tender points are tender in most healthy individuals. However, fibromyalgia patients appear to exhibit an exaggerated response. They may complain or withdraw from the examiner. The location of the tender points is shown in Figure 1. Enough pressure to blanch the examiner's fingernail is adequate. The patient's face and body posture should be observed while applying the pressure. It's best not to solicit a response by asking whether it hurts; but it is better to observe the patient's reaction to the applied pressure (11).

A variety of nonspecific complaints may accompany the syndrome (1). Musculoskeletal complaints in addition to pain include subjective swelling of muscles and joints. Temporomandibular joint complaints are common.

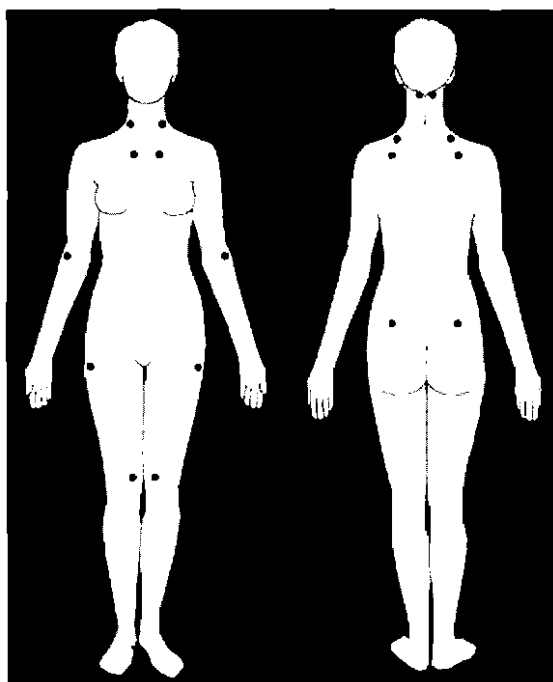


Figure 1. Pain and tenderness in the so-called "tender points" are the defining characteristics of fibromyalgia, so medical care providers focus on the features of the pain to distinguish it from other rheumatic disorders. Reprinted from the ACR Slide Collection on the Rheumatic Diseases, with permission from the American College of Rheumatology.

Rehabilitation Considerations in Fibromyalgia

- Active versus passive interventions are encouraged with this patient population to promote self-management.
- Fatigue, pain, and sleep disturbances impact function. It is important to teach techniques to adjust physical activity to accommodate these factors.
- Fine motor weakness may be present. Careful examination of fine motor activities should be conducted.
- Combine cognitive behavioral with exercise interventions to promote adherence and enhance outcomes of care.
- Aerobic exercise up to 30 minutes, 3 times per week is recommended to prevent deconditioning and enhance functional independence.

Fatigue is almost always present and may be reported as the most limiting feature of the patient's condition. Patients frequently complain of *cognitive dysfunction* characterized by forgetfulness and difficulty focusing. Studies, however, have failed to demonstrate an objective loss in cognitive function (12). Other nervous system complaints may include *paresthesias* in patterns that are neither dermatomal nor physiologically understandable. These paresthesias may be fleeting or constant. *Headaches* are common. Subjective *fine motor weakness* is frequently expressed as the inability to hold objects without dropping them. Restless leg syndrome may contribute to sleep disturbance.

Patients may complain of *chest pain* with or without respiration, but pleurisy is rarely identified. The pain is usually reproducible with palpation. Shortness of breath may relate to deconditioning because no clear cardiopulmonary pathology has been identified, with the possible exception of sleep apnea (13). *Raynaud's phenomena* occurs in ~20% of fibromyalgia patients, although criteria for an underlying connective tissue disease are usually absent.

Gastrointestinal complaints include dysphagia, which usually occurs in the pharyngeal or upper esophageal area. It is usually intermittent and nonprogressive, which distinguishes it from most organic causes. Alternating diarrhea and constipation typical of *irritable bowel syndrome* are common complaints. *Irritable bladder syndrome* has also been reported. Some patients have been identified as having interstitial cystitis (14), but a clear relationship does not exist.

Exclusion of other conditions that may produce similar complaints is important, but the approach should be rational. Therefore, unless a complete history and physical exam or initial laboratory tests point toward an explanation other than fibromyalgia, expensive scanning procedures should be avoided.

Laboratory Studies

Agreement on initial laboratory tests is not complete among experts. A complete blood count, extended chemistry panel, an inflammatory marker (such as erythrocyte sedimentation rate or C-reactive protein) and a thyroid stimulating hormone level are probably adequate. A creatine kinase level is often performed to rule out any primary or iatrogenic muscle disease (usually caused by statins). Antinuclear antibodies and rheumatoid factors may be positive in fibromyalgia patients in the absence of any underlying autoimmune disease. They should not be ordered unless clinically indicated by the existence of signs and symptoms associated with lupus, rheumatoid arthritis, or other autoimmune disorders. The most common differential diagnoses for fibromyalgia are listed in Table 2.

Sleep History

A careful sleep history is needed to identify an underlying organic sleep disorder, seen particularly in men (13). When possible, family members should be queried about the patient's sleep. Emphasis should be placed upon whether the patient snores loudly, startles frequently during sleep, and has had observed apneic episodes. The presence of apneic episodes, in particular, warrants further investigation for obstructive sleep apnea given its high association with cardiovascular disease, hypertension, and sudden death (14). It is helpful to demonstrate to family members and the patient's bed partner what apneic episodes may look like. Identification of these features should generate referral to a pulmonologist or sleep specialist.

Typically, patients have seen multiple specialists and have had many tests before the diagnosis of fibromyalgia is established. After the diagnosis is established there may be a period of time where utilization of services declines (15).

Table 1. Criteria for the classification of fibromyalgia*

1. History of widespread pain.

Definition. Pain is considered widespread when all of the following are present: pain in the left side of the body, pain in the right side of the body, pain above the waist, and pain below the waist. In addition, axial skeletal pain (cervical spine or anterior chest or thoracic spine or low back) must be present. In this definition, shoulder and buttock pain is considered as pain for each involved side. "Low back" pain is considered lower segment pain.

2. Pain in 11 of 18 tender point sites on digital palpation.

Definition. Pain, on digital palpation, must be present in at least 11 of the following 18 sites:

Occiput: Bilateral, at the suboccipital muscle insertions.

Low cervical: bilateral, at the anterior aspects of the intertransverse spaces at C5-C7.

Trapezius: bilateral, at the midpoint of the upper border.

Supraspinatus: bilateral, at origins, above the scapula spine near the medial border.

Second rib: bilateral, at the second costochondral junctions, just lateral to the junctions on upper surfaces.

Lateral epicondyle: bilateral, 2 cm distal to the epicondyles.

Gluteal: bilateral, in upper outer quadrants of buttocks in anterior fold of muscle.

Greater trochanter: bilateral, posterior to the trochanteric prominence.

Knee: bilateral, at the medial fat pad proximal to the joint line.

Digital palpation should be performed with an approximate force of 4 kg.

For a tender point to be considered "positive" the subject must state that the palpation was painful. "Tender" is not to be considered "painful."

For classification purposes, patients will be said to have fibromyalgia if both criteria are satisfied. Widespread pain must have been present for at least 3 months. The presence of a second clinical disorder does not exclude the diagnosis of fibromyalgia.

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Table 2. Conditions that may mimic fibromyalgia

Drug-induced myopathy
Thyroid disorders (hypo, hyper)
Hyperparathyroidism
Polymyalgia rheumatica
Rheumatoid arthritis
System lupus erythematosus
Depression

MANAGEMENT

A rheumatologist may affirm the diagnosis, however, many rheumatologists will refer the patient back to the primary care provider with recommendations for management. Whether rheumatologists should treat fibromyalgia patients is controversial. There is no clear line of evidence showing that fibromyalgia patients have better outcomes in the hands of specialists (16).

Patient education is important for alleviating fear and improving outcomes (17). Patients are often relieved because they erroneously expect to become deformed, disfigured, and disabled. The Arthritis Foundation (AF) provides informative pamphlets and material on their Web site (www.arthritis.org) that is suitable for patients. Alternatively, the patient can be referred to the local AF chapter to learn about local resources including support groups. (Additional sources of credible information, including the American College of Rheumatology, can be found in Chapter 48). Patients should be reminded that many Web sites are not run by professional associations and others are purely for profit. These should be approached with caution.

As a chronic complex pain syndrome, fibromyalgia is managed using a *multidisciplinary approach* addressing sleep restoration, pain management, psychosocial treatment, and an exercise program (18). Compartmentalizing the approach into these distinct categories is often a matter of convenience rather than practicality. The effects of many interventions impact 2 or more categories.

Pain syndromes like fibromyalgia are sometimes depicted as having reciprocal interactions. In this model, pain, sleep disturbance, deconditioning, and mood disturbance are all affected by one other. Occasionally a single treatment may result in improvement in all areas. More often, all 4 areas need to be addressed simultaneously to achieve a reasonable degree of improvement in the patient's condition. Medications commonly used to treat fibromyalgia are listed in Table 3.

Sleep

Sleep hygiene is an obvious but often overlooked topic of discussion with the patient. Patients should be reminded to establish a sleep routine that includes regular hours, comfortable temperatures, and limited noise. Stimulants, alcohol, and exercise should be avoided in the hours prior to sleep. They should be reminded that the bed should be used for only 2 things and 1 of them is sleep (they may laugh when you say this). Food, pets, hobbies, and television should be kept out of the bedroom.

Sleep may be improved with a tricyclic antidepressant, such as amitriptyline, taken about an hour before bedtime (19). The usual starting dose is 10–25 mg. The dose can be titrated upward according to effect. Patients may experience daytime drowsiness as a side effect. Taking the medication a little earlier and allowing enough time for a full 8 hours of sleep may help.

Patients with fibromyalgia may have such significant sleep disturbance that they never dream. The recurrence of dreaming is a good sign, but patients may experience extraordinarily vivid dreams or even

nightmares while under therapy with amitriptyline. They may be reluctant to increase the dosage, which may be required to promote a deeper level of sleep such that they are not awakening during their dreams.

Alternatively, cyclobenzaprine in doses of 10–20 mg an hour before bedtime may be used (20). If refractory to amitriptyline and cyclobenzaprine, alprazolam, trazadone, or hypnotics (zopiclone or eszopiclone) can be tried, but referral to a sleep specialist may be needed to exclude an underlying organic sleep disturbance that is preventing the treatment from restoring restful sleep (13).

Pain

Amitriptyline has also been shown to relieve pain (19), however this effect is often delayed. Patients should not expect the more immediate analgesia that is seen with opioids. Opioids are effective at relieving fibromyalgia pain (21), but tolerance may occur if they are used chronically, and dose escalation should be expected. The dependence that may develop is contrary to most principles of chronic benign pain management, which focuses on restoration of function (22). As a result, opioids should be avoided. One exception may be tramadol. This unique agent has both opioid-like and tricyclic antidepressant-like features. Dependence and abuse are rare, such that it is not scheduled as other opioids and narcotics according to the Food and Drug Administration (23).

A newer agent, duloxetine, is indicated for depression and diabetic peripheral neuropathy, but has been studied in fibromyalgia and appears to be an effective pain reliever (24). Pramipexole has been approved for Parkinson's disease and has been used off label for restless leg syndrome, which may be seen in fibromyalgia patients. Pramipexole has been shown to relieve pain and promote sleep in fibromyalgia patients through its effect on dopamine receptors in the CNS (25). Side effects may be limiting at the dosages used in the study.

Two other medications indicated for neuropathy have been reported to help fibromyalgia pain. Gabapentin and pregabalin may modulate or partially block neuronal calcium channels, resulting in a reduction in the release of pain-mediating neurotransmitters (26).

Nonsteroidal antiinflammatory agents are commonly used despite a paucity of evidence demonstrating any significant efficacy (27). Considering the gastrointestinal and cardiovascular side effects, the risk-benefit ratio weighs against their use. If used, their efficacy should be determined within 1 or 2 weeks of initiating therapy, and they should be immediately discontinued if they are not clearly effective. Glucocorticoids are not effective in fibromyalgia (27). Sometimes they can be helpful if there is the suggestion of a concomitant inflammatory condition. If lack of response after a brief trial suggests otherwise, they should be discontinued.

Table 3. Medications commonly used in the treatment of fibromyalgia

Drug(s)	Dosage (mg)
Amitriptyline	10–50 at bedtime
Cyclobenzaprine	10–20 at bedtime
Fluoxetine	20–80 each morning
Tramadol	50–100 four times per day (titrated)
Tramadol/ER	100–300 per day (titrated)
Venlafaxine	37.5 twice per day
Duloxetine	60 twice per day
Gabapentin	up to 1800 per day (divided)
Pregabalin	up to 450 per day (divided)
Pramipexole	0.25–4.5 each bedtime (titrated)
Zolpidem	5–10 each bedtime

Nursing Considerations in Fibromyalgia

- Assist in identifying community resources, i.e., support groups.
- Some patients with fibromyalgia are taking many drugs from multiple prescribers; instruct patients to keep accurate up-to-date lists of medications, including supplements and vitamins, to be shared with caregivers as well as pharmacists.

Mood

Mood and pain are often addressed together using single or combination approaches. Tricyclic antidepressants, which have been around for ≥ 50 years, such as amitriptyline and cyclobenzaprine, have proven useful for addressing both mood disturbance and pain. The combination of using a serotonin-specific reuptake inhibitor (e.g., fluoxetine, sertraline) in the morning and amitriptyline in the evening also is effective (28). Newer mixed reuptake inhibitors, such as venlafaxine, which have combined effects on serotonin and norepinephrine, also may be helpful (29). Duloxetine has antidepressant effects and may have a greater impact on mood over pain in fibromyalgia patients (24).

Most patients should be referred to a psychologist or psychiatrist for thorough evaluation and possibly comanagement of significantly depressed mood. Depression may need to be managed aggressively if severe, because suicide is a potential risk. Psychologists also help patients to develop pain coping skills through biofeedback, visualization techniques, and counseling (see chapter 33 on cognitive-behavioral therapy). The *Arthritis Foundation Self-Help Program* is a group-education program that gives fibromyalgia patients an opportunity to learn and practice self-management skills. Trained volunteers, many of whom have arthritis or fibromyalgia, teach these courses. Some patients consider support groups helpful (30), but some caution is warranted because support groups may not be run by mental health or arthritis professionals and can have highly variable methods and goals.

In many practice settings, most of the coaching and counseling is provided by nursing providers. These front-line caregivers are the first to learn when a treatment isn't working or the patient has experienced a setback.

Physical Activity and Exercise

Exercise has been shown to reduce pain and fatigue as well as improve sleep and mood (31,32). It may be the most empowering thing a patient can do to manage their condition.

If cleared from a cardiopulmonary standpoint, all patients should be encouraged to participate in a regularly scheduled, graded, low-impact aerobic exercise program. Walking in a warm water pool may be an excellent starting point for severely affected patients. The warmth may be therapeutic and the water's buoyancy reduces the effect of gravity on the muscles and joints. The *Arthritis Foundation Aquatic Program* is offered in many community pools and YMCAs throughout the United States. The resistance from walking in water allows the heart rate to rise with less effort. If successful, patients can progress to land-based exercises. For less affected patients, a stationary bicycle or treadmill may be a reasonable starting point.

Regardless of the exercise chosen, the goals and rules are the same. The patient should eventually perform continuous aerobic activity for 30 minutes at least 3 times a week. The greatest obstacle to exercise is the pain it generates. Instruct patients to start at a level they know they can handle and to gradually increase the time they exercise each session, until they reach 30 minutes of sustained aerobic activity. They

should then begin to increase the speed or vigor of their activity until they are exercising at a moderate intensity. This can be determined using a standard aerobic exercise heart rate chart (Figure 2).

At times, patients may need to reduce the duration or intensity of their exercise if they feel they have advanced too quickly with resulting pain. The biggest mistake patients make is to do too much too soon, such that they never want to exercise again. Encouraging a go-slow approach should prevent this from occurring and will reduce the likelihood of them quitting the exercise program. This approach may require months for the patient to be reconditioned, but remind them that the effort is worth it.

Physical therapists and certified exercise specialists may also assist in the development of an exercise program by teaching the patients how to avoid injury through ergonomics and by stretching and strengthening related muscle groups. Passive techniques such as massage, heat, cold, and ultrasound may provide pain relief, but should be primarily used to maintain function rather than relieve pain. Over reliance on these techniques for the purpose of pain relief fosters dependence that is contrary to the main goal of pain management. Patients can be taught to perform some of the passive techniques on themselves. Passive and active techniques used in combination with a graded aerobic exercise program can enable patients to achieve their conditioning goals.

Rehabilitation specialists have played a central role in both multimodal and multidisciplinary rehabilitation programs. The latter may not be as effective as the former (18,33).

OUTCOMES

It is unreasonable to expect a cure. However, most patients are eager to get any relief from their pain and fatigue. Outcomes frequently depend more on what the patient does than what the caregivers do to them. Encouragement to continue their prescribed management program, particularly the exercise component, may be the most important thing we offer the patient. A good support group may also assume this function. Support group dynamics are variable and therefore group therapy may not always serve the desired purpose. Certain Arthritis Foundation chapters sponsor local support groups that may be monitored by an employee of the chapter to assure that the group functions appropriately.

Up to 30% of fibromyalgia patients may apply for disability from a private insurer or through the Social Security Administration (34). Patients should be encouraged and supported in their efforts to remain functional and employed as long as possible. Disability insurers and examiners are beginning to recognize fibromyalgia as a potentially disabling condition. Regardless, the lack of objective laboratory and

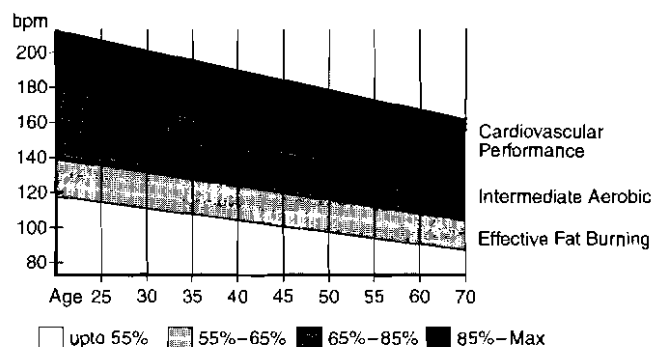


Figure 2. Standard heart rate chart.

radiographic findings, along with the limited physical features associated with the condition, make it difficult for patients to get a disability settlement (35).

CONCLUSION

Fibromyalgia is difficult to manage. Health care providers may do more harm than good by prescribing inappropriate medications or performing unnecessary procedures (36). These behaviors may result from the sense of impotence and frustration that providers feel when they assume total responsibility for healing the patient. This can be avoided by assuring that the provider and the patient have a realistic understanding of the nature of the condition, the management approach, and the likelihood for improvement.

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